

PATENT CLAIMS

1. A control device for a hydraulic differential containing two integrated within the common driving unit of the hydraulic differential control hydraulic loops having a distributor embodied as a common gate mechanism, where each of the loop includes two main collectors of toroidal configuration, and control branches with electromagnetically actuating of their control elements, characterized in that
- the gate (1) of the main distributor (2) is a rotating body in a form of a cylinder having an axial opening where at equal distances from the ends of the cylinder two identical discs thinned towards their periphery are formed, thus the gate (1) is symmetrical with respect to the plane crossing perpendicularly the middle of its longitudinal axis, and the interior of the body of the main distributor (2) has the same parameters of symmetry and it is configured so that only in a neutral position of the gate (1) at both sides of each disc separate chambers insulated from each other are formed, where the chambers at each side of the gate (1) are connected with areas of high and low pressure in separate hydraulic loops, so that the pressures of both loops have opposite directions to the discs of the gate (1) along its longitudinal axis, and the cross point of the longitudinal axis of the gate (1) and its transverse plane of symmetry lies on this side of the rotating axis of the differential which crosses its common driving unit.
2. A control device for a hydraulic differential according to claim 1, characterized in that in each of the hydraulic loops in channels between the main collectors devices (3) are

mounted for smooth engagement of the differential clutches and for reversing the hydraulic flow, the devices (3) including cylindrical gate (4) with an axial channel, where at equal distances from its middle point across the cylindrical surface of the gate (4) two parallel and radially oriented channels are formed, and oppositely to each of these channels in the cylindrical surface of the gate (4) two additional channels are radially formed, where each of these channels goes separately and parallel to the axial channel to the more distant end of the gate (4), which is mounted between two springs (5) within a hollow cylindrical body (6) in the middle of which opposite to each other two openings are radially formed, and the hollow cylindrical body (6) has caps (7) each having an opening for connection with the main toroidal collectors of the loop, the inner sides of the caps being formed as seats of the gate (4), where in the base part of these seats connecting channels to the openings of the caps (7) are formed, thus the hydraulic loops of the clutches pass from the main toroidal collectors through the caps (7) of the cylindrical body (6) and through the opposite openings in its middle to a couple of additional toroidal collectors (8), which are mounted within the driving unit externally and concentrically in relation to the main collectors, where the longitudinal axes of the devices (3) are radially oriented within the driving unit of the differential and are arranged oppositely in relation to the axis of rotation of the differential.

3. A control device for a hydraulic differential according to claim 1, characterized in that safety valves (9) are mounted in separate branches of each of the loops, where the branches connect couples of the additional collectors (8), and each of

the safety valves (9) consists of a body (10) including three successively connected hydraulic cylinders having a common axis of symmetry, where pistons (11, 12) are disposed within the two end cylinders of the body (10) and partially in the space with working fluid of the middle cylinder having the greatest diameter, within which a spring (13) is disposed and is in contact with the pistons (11, 12), and the space of the cylinder is connected with a low pressure area of the loop by means of a channel coming from the middle of the cylinder, where the outer ends of the cylinders are connected to a high pressure area of the hydraulic loop so that the channel to the cylinder with the piston (11) has a high hydraulic resistance, and the head of the piston (12) in the second end cylinder having diameter smaller than the diameter of the piston (11) is formed as a gate, which in its open position connects the areas of high pressure and low pressure of the loop through a separate channel, where the safety valves (9) in the common driving unit of the differential have an opposite arrangement with regard to its axis of rotation toward which the axes of symmetry of the bodies (10) have same angles.

4. A control device for a hydraulic differential according to claim 1, characterized in that electromagnetically actuated devices (14) are mounted in separate branches of each of the hydraulic loops and are supplied through contact rings (15), which are fixed to the driving unit of the differential and are placed in a separate box (16) attached to the casing of the differential, and the armature (17) of each of the devices (14) has a cylindrical form with an axial opening and consists of a non-magnetic distributing part to which at least one magnetic part is rigidly connected, where the devices (14) within the

driving unit are mounted oppositely in relation to the axis of rotation of the differential and have radially oriented longitudinal axes.

- 5 5. A control device for a hydraulic differential according to claim 1, characterized in that all additional toroidal collectors (8) are connected to each other by means of hydraulic throttles (18), so that the high pressure collectors in each loop are connected to the low pressure collectors, and there are such connections between the loops in the directions high –
10 high and low – low pressure, where the hydraulic throttles (18) are mounted in the common driving unit symmetrically to its axis of rotation.